

| 1861.<br>No. times.      | 1862.<br>No. times. |                                                                                                                                                      |
|--------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| 30<br>23<br>20<br>4<br>1 | 32<br>28<br>4       | with thunderstorms. with rains without thunder and lightning: with dry storms (without rain and without thunder and lightning). with snow. with fog. |
| 78                       | 67                  |                                                                                                                                                      |

VII. Relation of Rain and Snow to Electricity.
Rain without thunderstorm was accompanied

|                              | By Pos   | itive Electricity. | By Negative Electricity. |          | By no Electricity. |                               |
|------------------------------|----------|--------------------|--------------------------|----------|--------------------|-------------------------------|
|                              | In 1861  | . In 1862.         | In 1861.                 | In 1862. | In 1861.           | In 1862.                      |
| January<br>February<br>March | 7        | 5                  | 3 4                      | 2 1      |                    | 2                             |
| April                        | 8<br>10  | 6                  | 1                        | 11       | 3                  | 1<br>3                        |
| August                       | 3<br>  4 |                    | 1                        | 1        | 1<br>4             | 2<br>8                        |
| November December            | 2        | 3                  |                          | 7        |                    | <ul><li>7</li><li>6</li></ul> |
|                              | 50 + e   | 1. 36 + el.        | 23 - e                   | 28 — el. | 15 no el.          | 34 no el.                     |

Snowing was accompanied

|                                | By Positi ci | ve Electri-<br>ty. | By Negative Electricity. |          | By no Electricity. |          |
|--------------------------------|--------------|--------------------|--------------------------|----------|--------------------|----------|
|                                | In 1861.     | In 1862            | In 1861.                 | In 1862. | In 1861.           | In 1862. |
| January February March October | J            | 12                 |                          |          |                    |          |
| November December              | 5            | 2                  | 2                        | 3—el.    | •••••              | 1l       |

## REMARKS.

The monthly mean of atmospheric electricity in 1862 was not quite so regular as that in 1861. While in 1861 an un-

interrupted descent and ascent took place from January to December, we find in 1862 some interruptions in the steps of that ladder. The electricity in February, 1862, is about four degrees higher than that of January, April somewhat higher than March, and July is the lowest instead of September in 1861. These trifling irregularities may be accounted for by differences in temperature and relative humidity, and by a greater number of thunderstorms in 1862. January of 1862, for instance, was so unusually rainy, that its relative humidity too was unusually high, diminishing thus electricity. But the general features of distribution of electricity throughout the year are apparent in both years, and we may in that respect divide the twelve months of each year into two or three groups. Computing the months which give the highest electricity and those which give the lowest in each year, we find that in both years the months of January, February, March, April, November and December exhibit the highest, and the months of May, June, July, August, September and October the lowest electricity. The first group gives

The aggregate monthly mean of 71.5 degrees of electricity in 1861 and 74.6 " " 1862 While the second group gives 29.0 " " 1861 and 25.7 " " 1862

The second group prevailed therefore in 1861, and the 1st in 1862.

Or we may divide the twelve months of each year into three groups. The first group with the highest electricity is formed by the months of January, February, November and December; the second with a mean electricity by the months of March, April, May and October; and the third with the lowest electricity by the months of June, July, August and September.

The aggregate monthly mean of

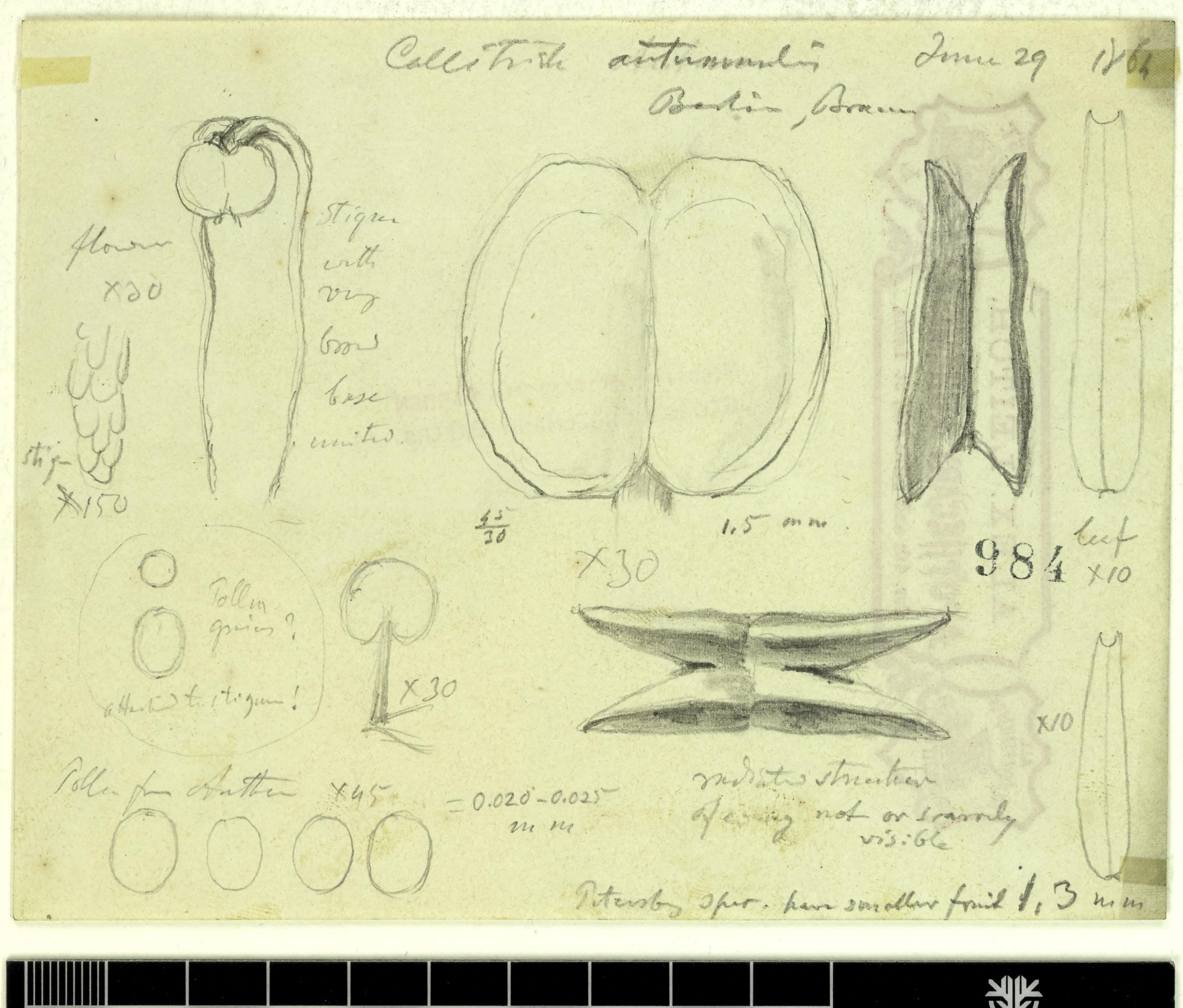
The first group in 1861 is 52.9—in 1862, 54.6
The second " 33.5 " 35.2
The third " 14.1 " 10.5

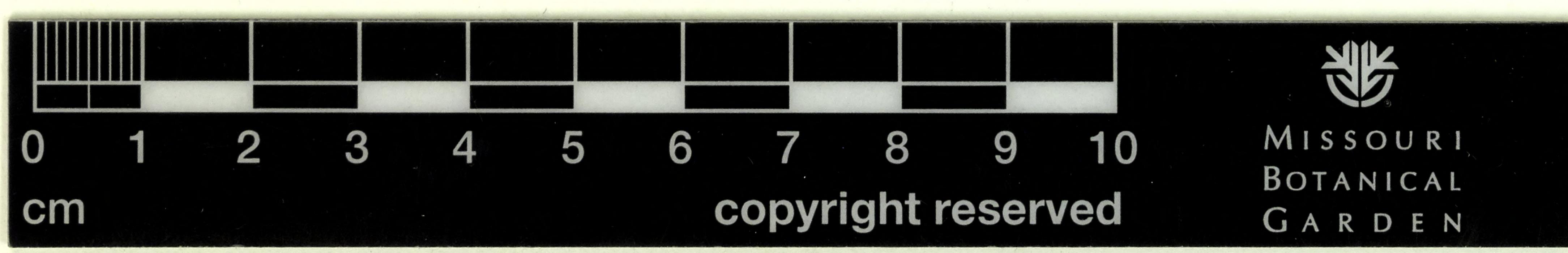
Thus in 1861 the third group prevailed, and in 1862 the first and second. But these differences are so well balanced throughout the year, that the mean of the whole year in 1861 and in 1862 is exactly the same, namely, 8.4. Such an identity in the yearly result, even to decimals, is of course not to be expected every year; but it seems to prove, at least, that the yearly mean of electricity is as constant as that of temperature, of relative humidity, and of atmospheric pressure.

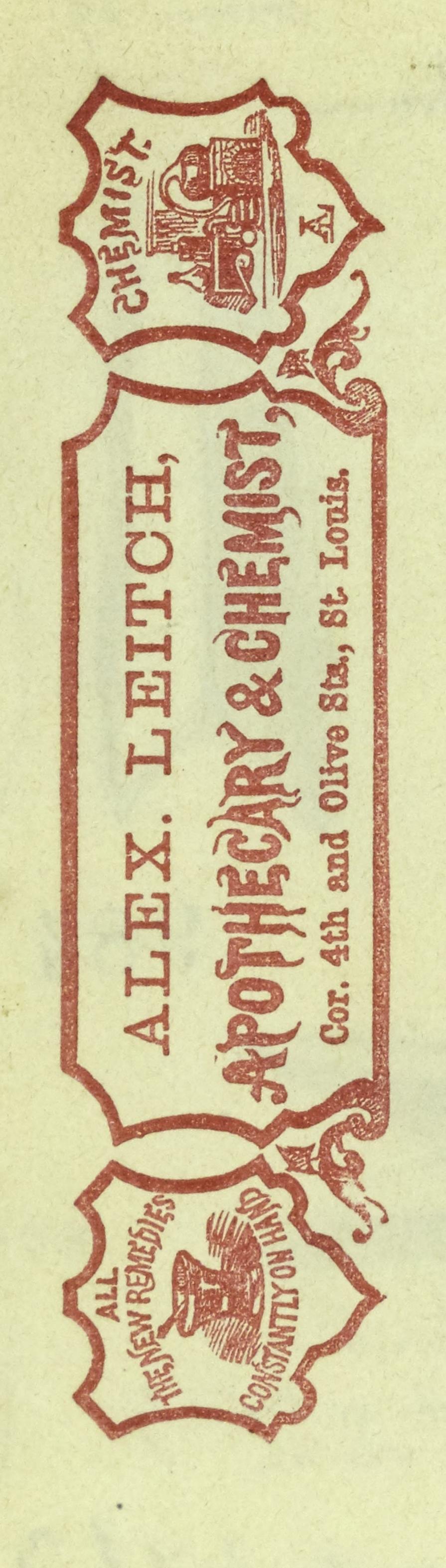
The third table, showing the daily periodicity of atmospheric electricity, confirms the daily two maxima and two minima of electricity as an undeniable fact.

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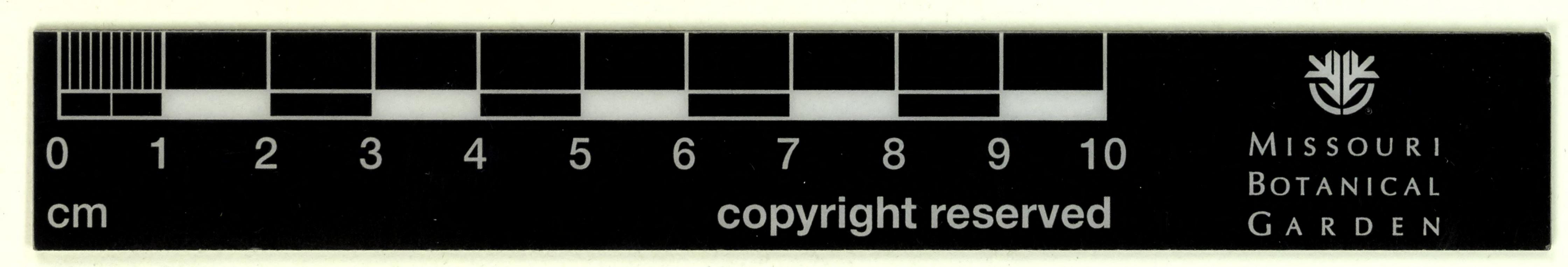






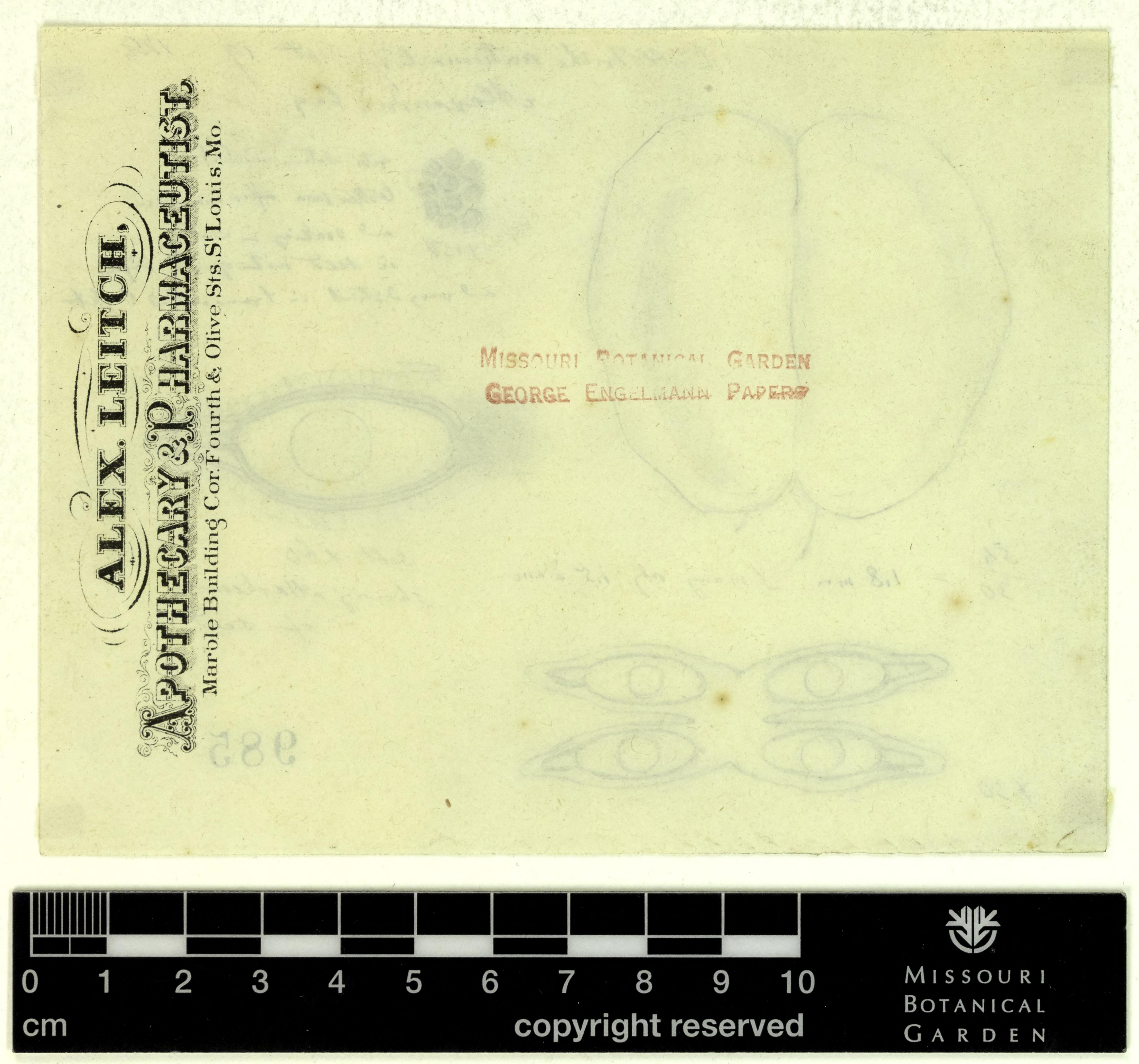


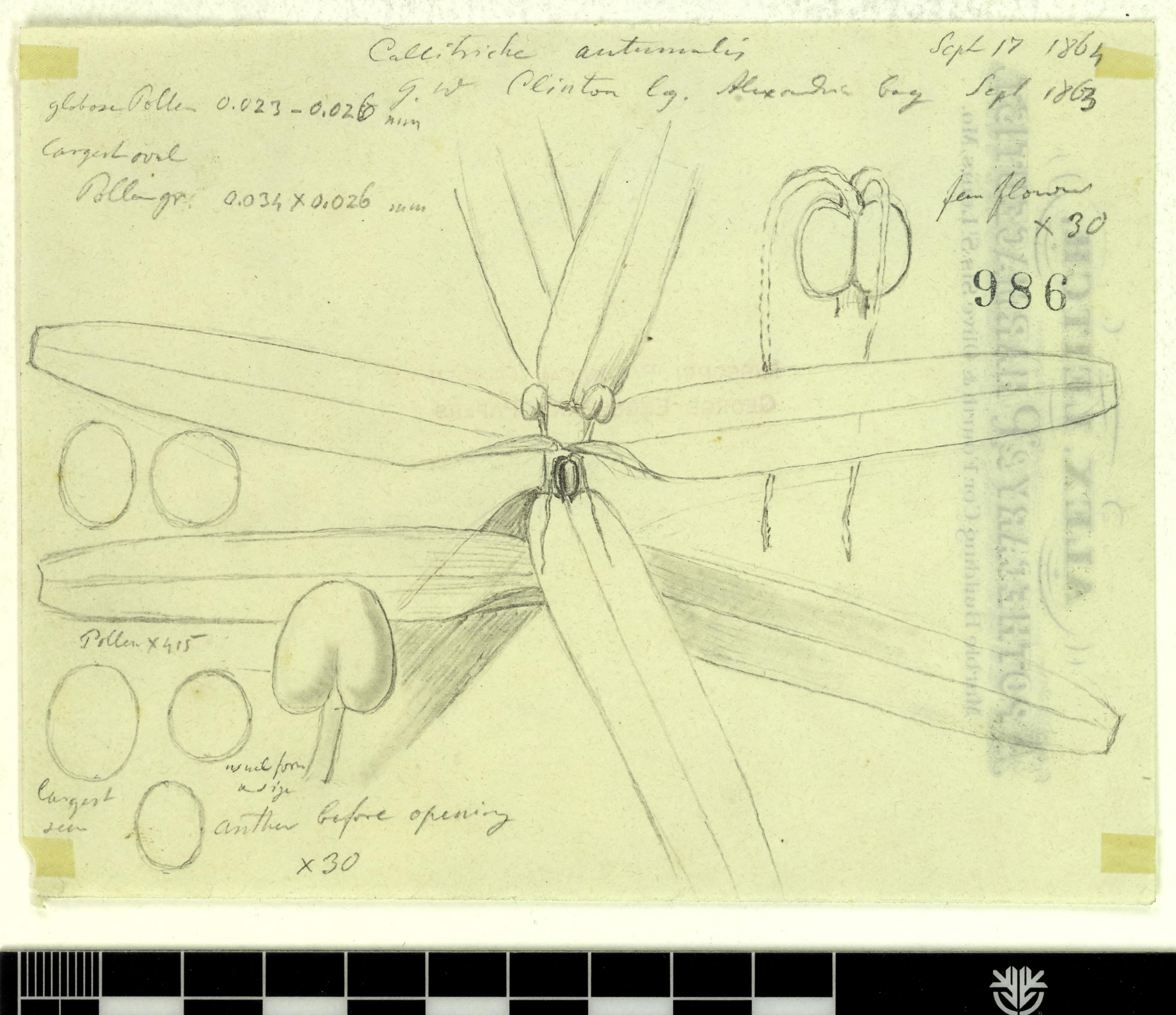
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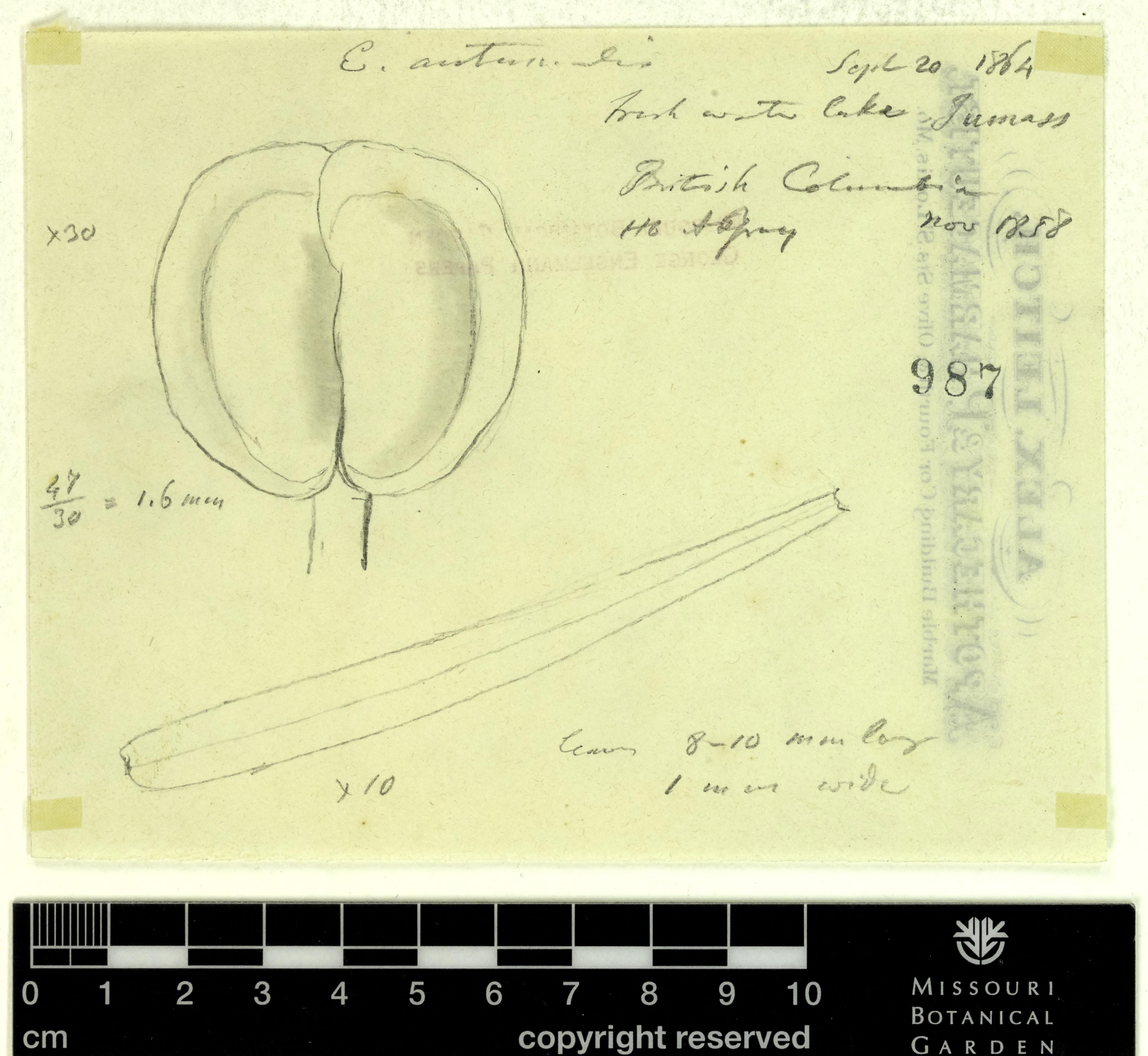


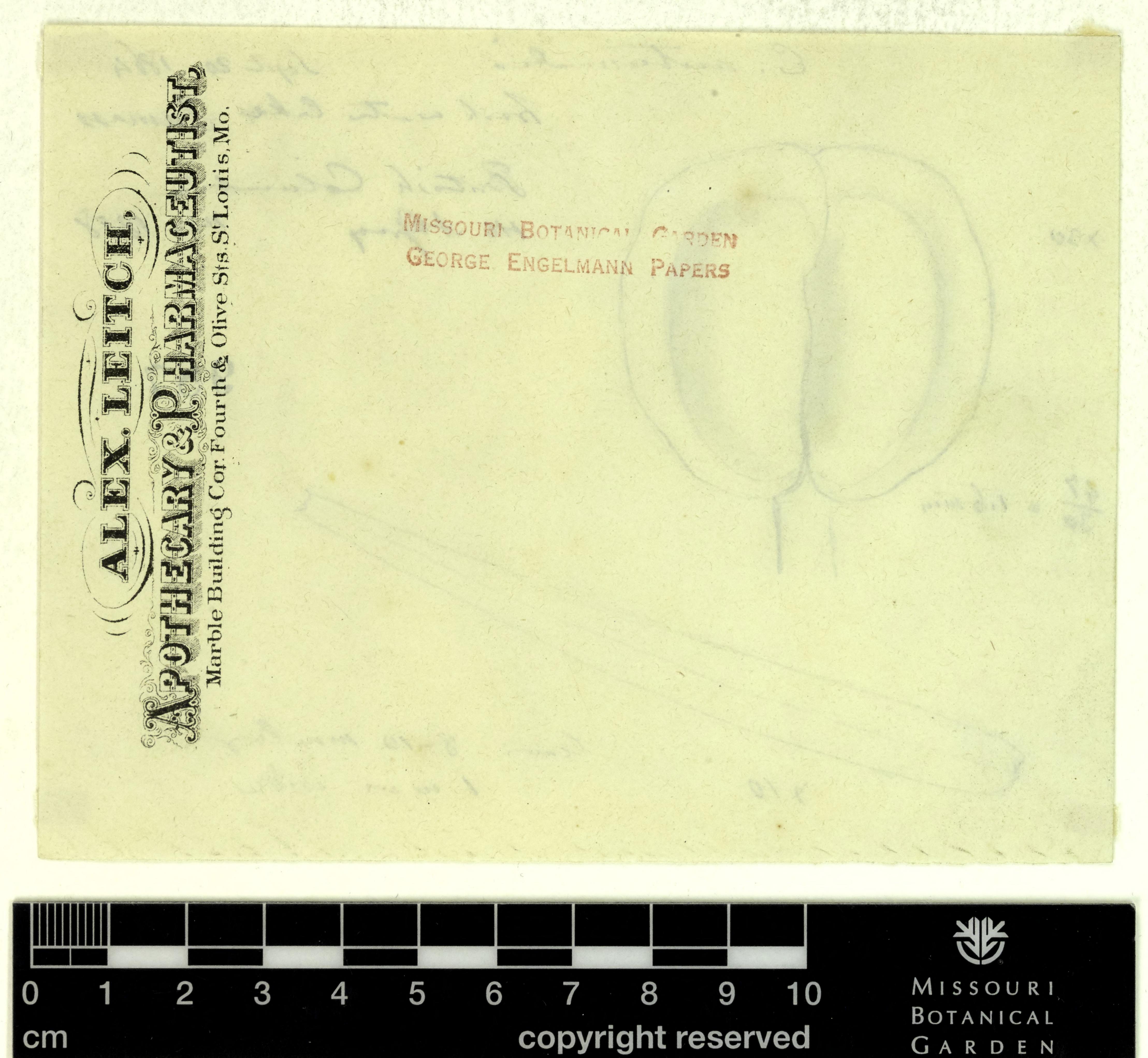


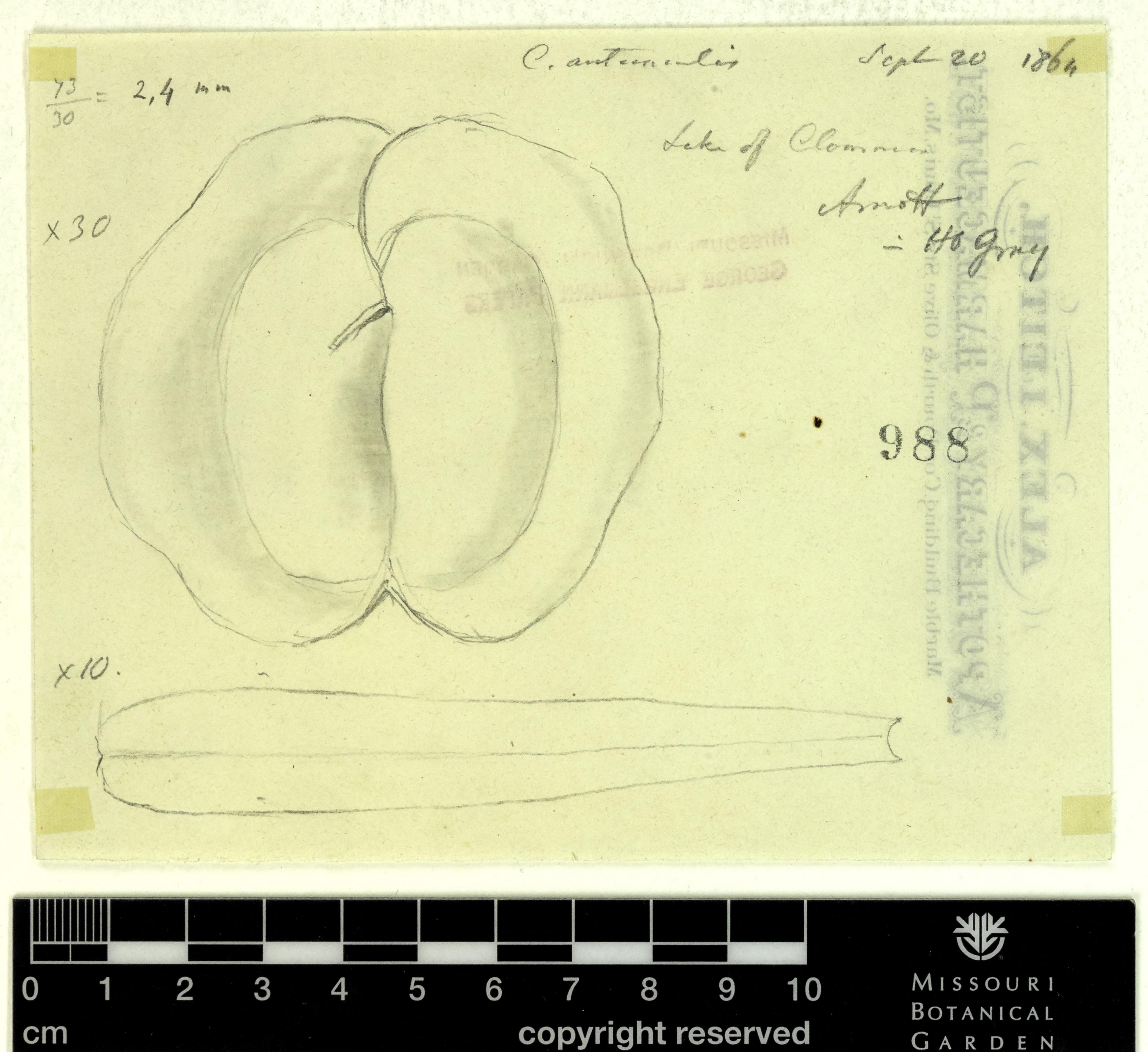


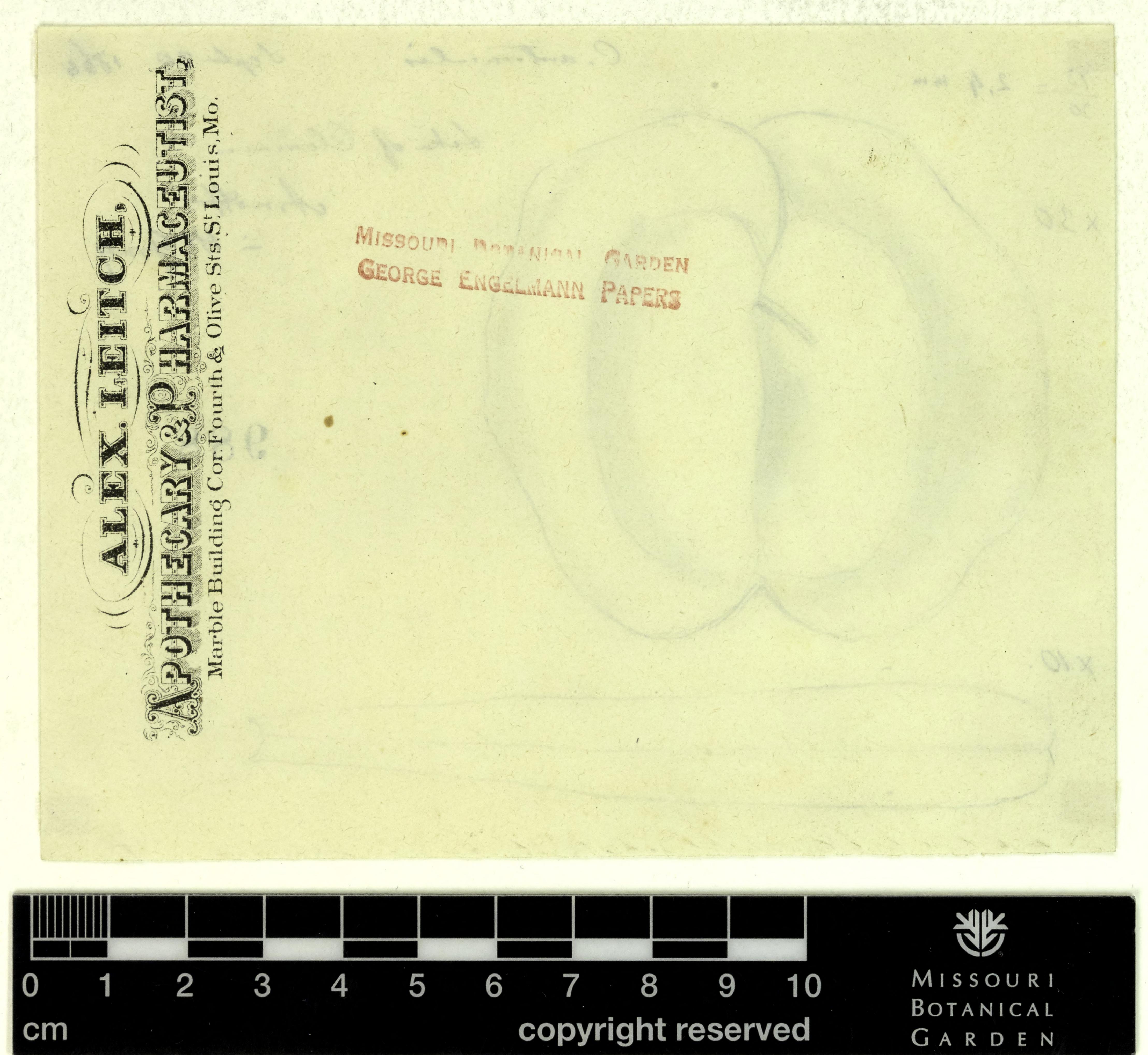


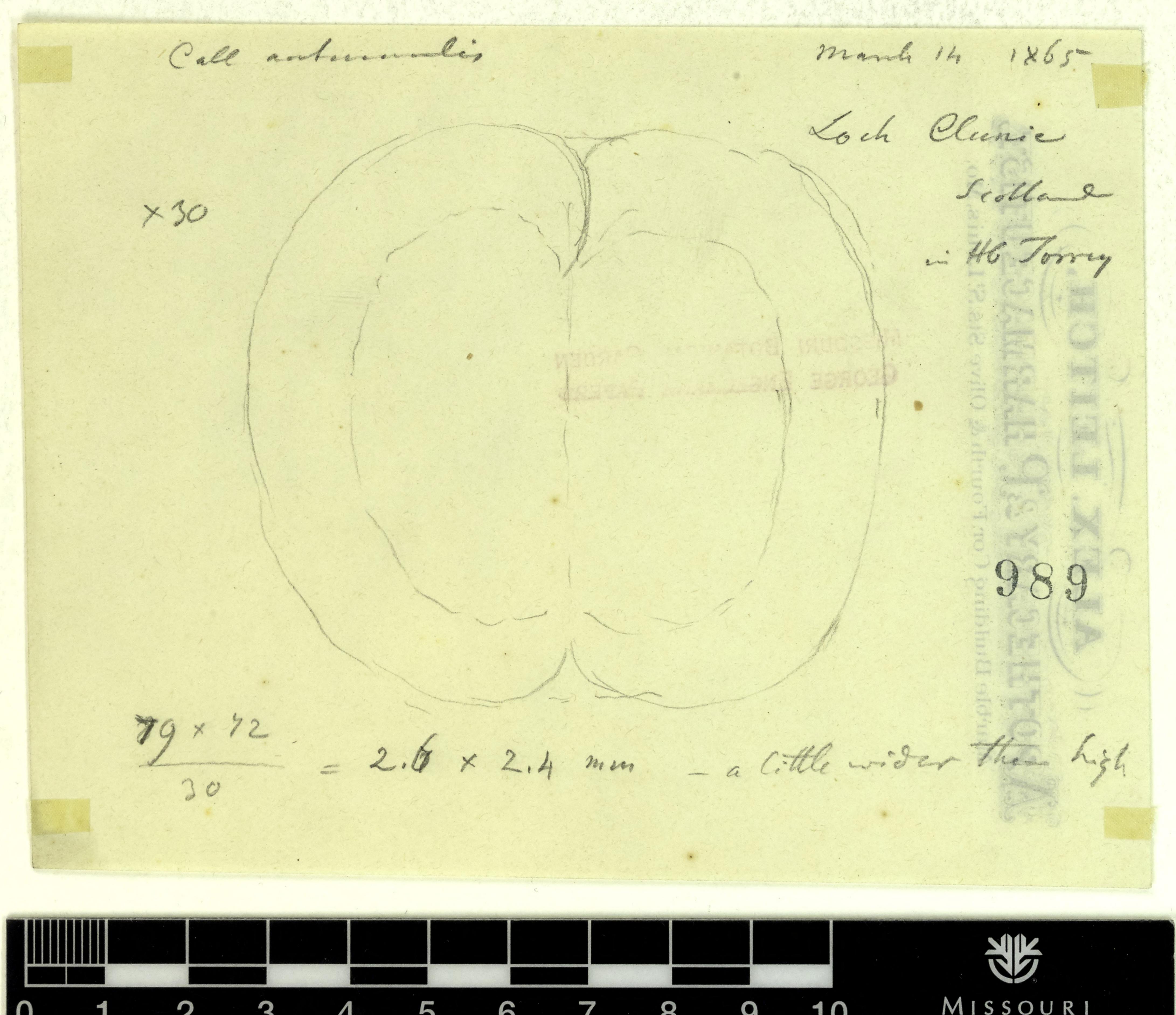
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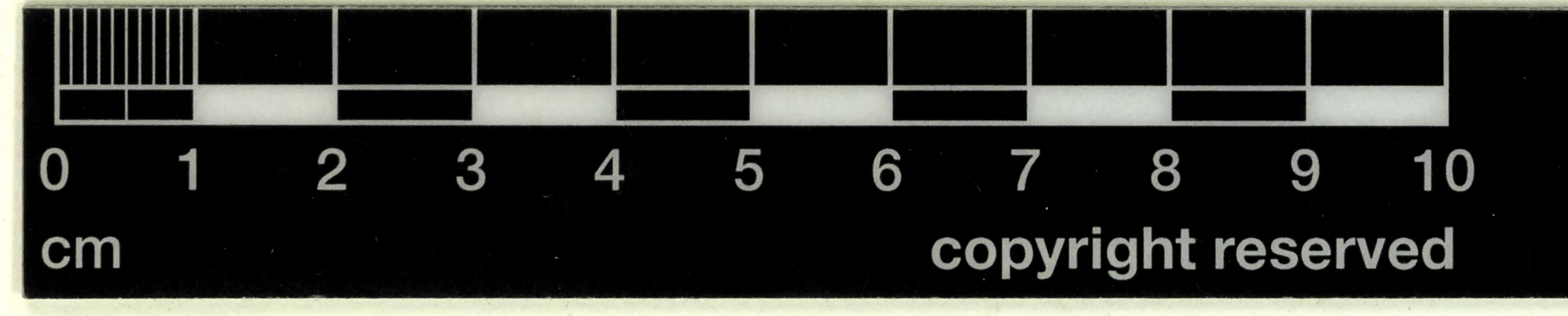


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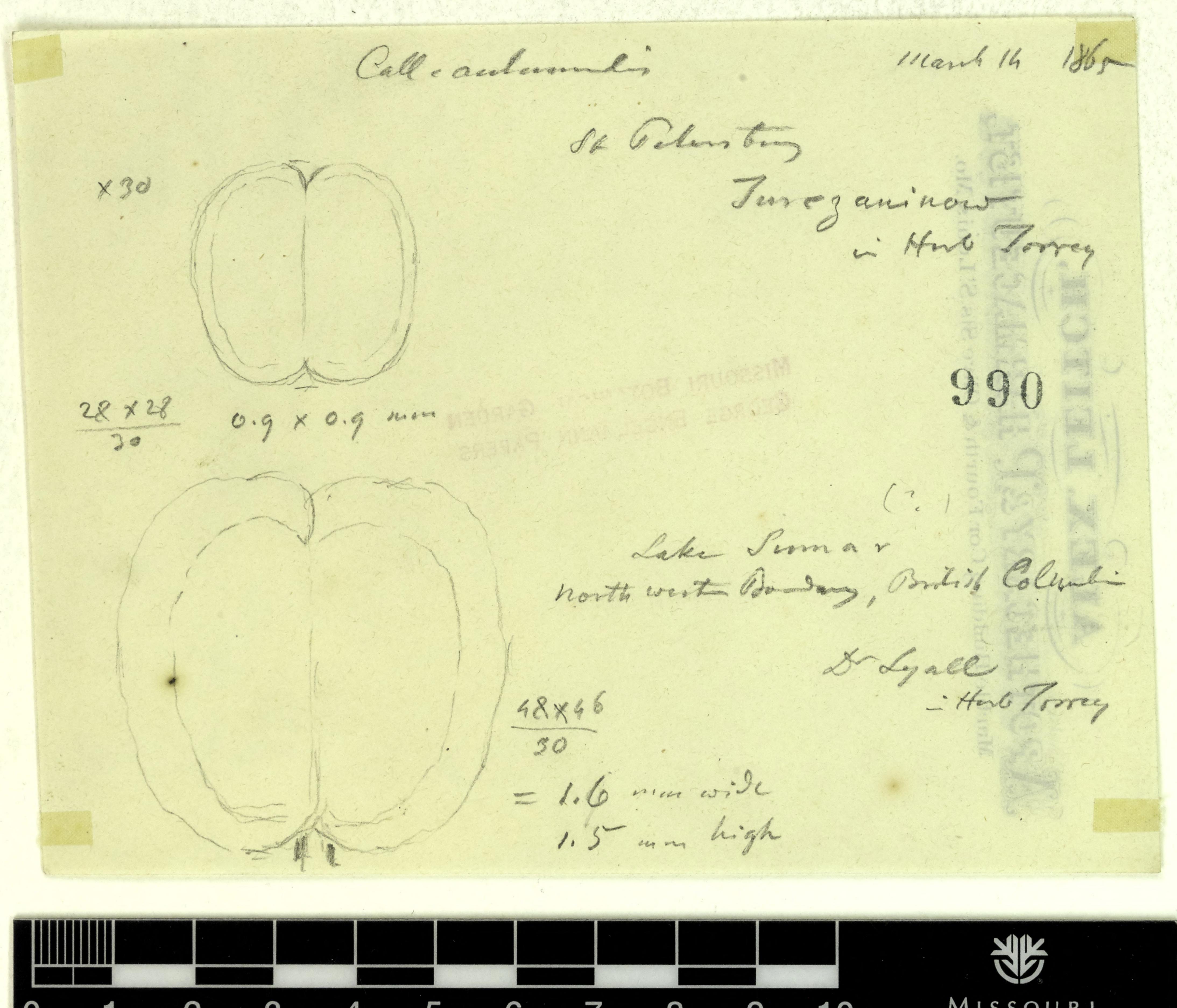
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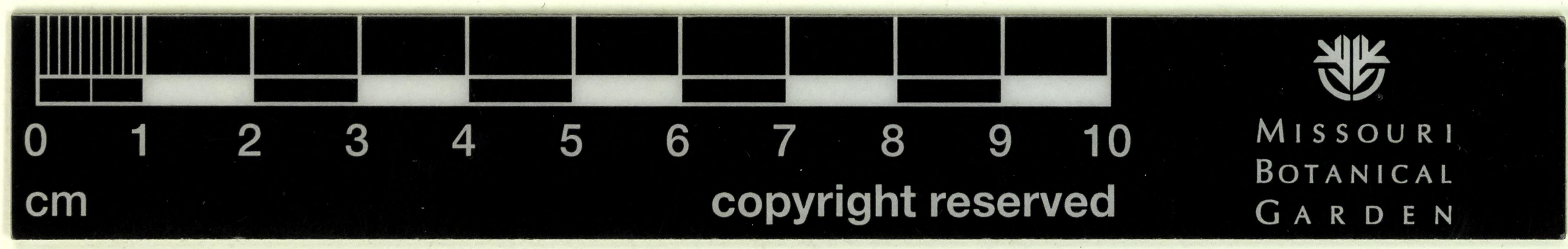
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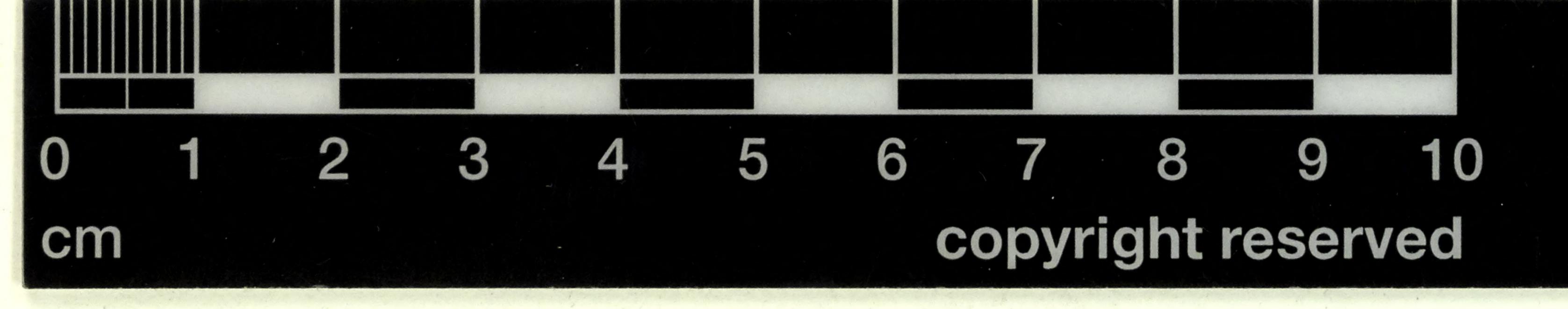




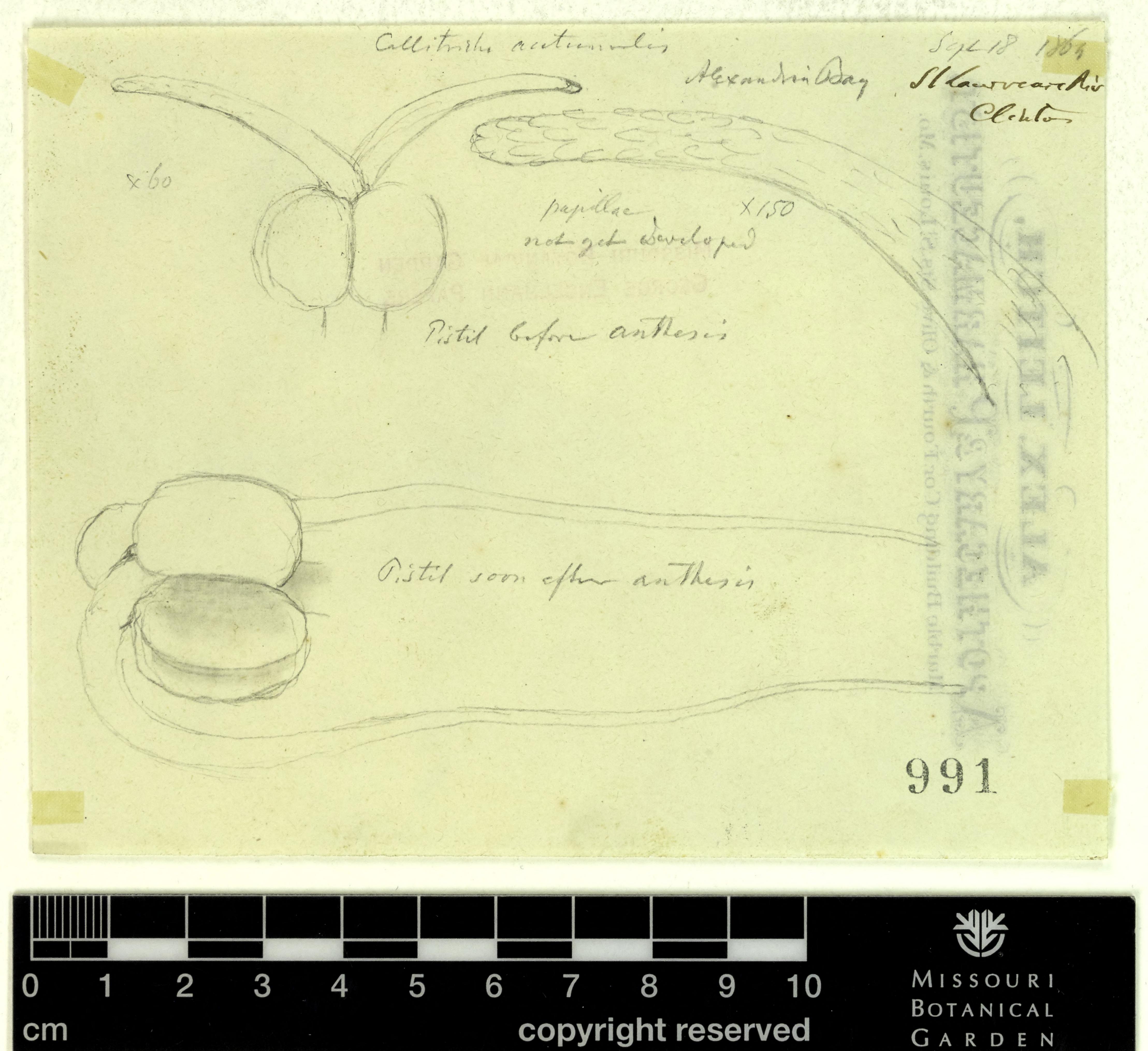




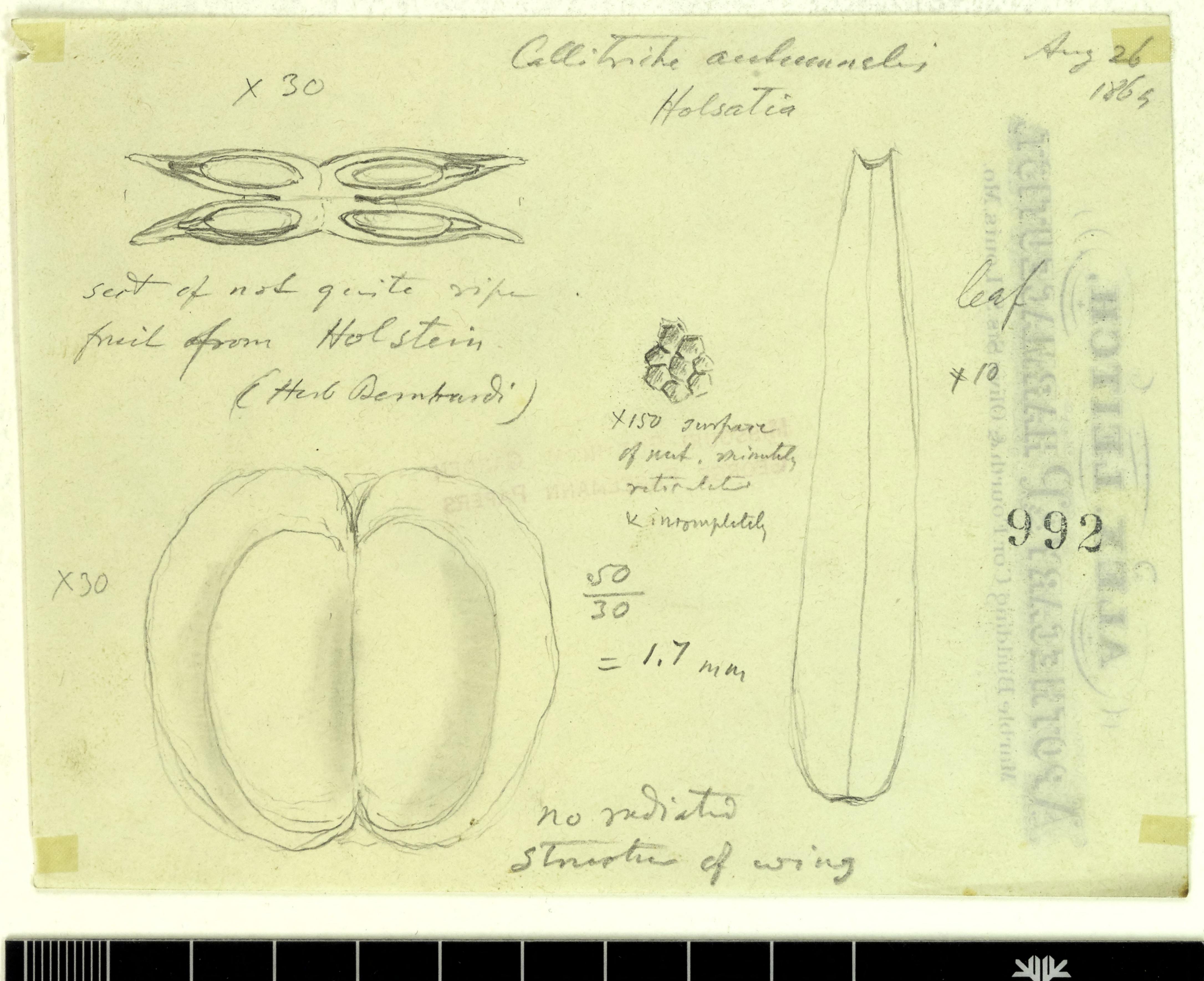
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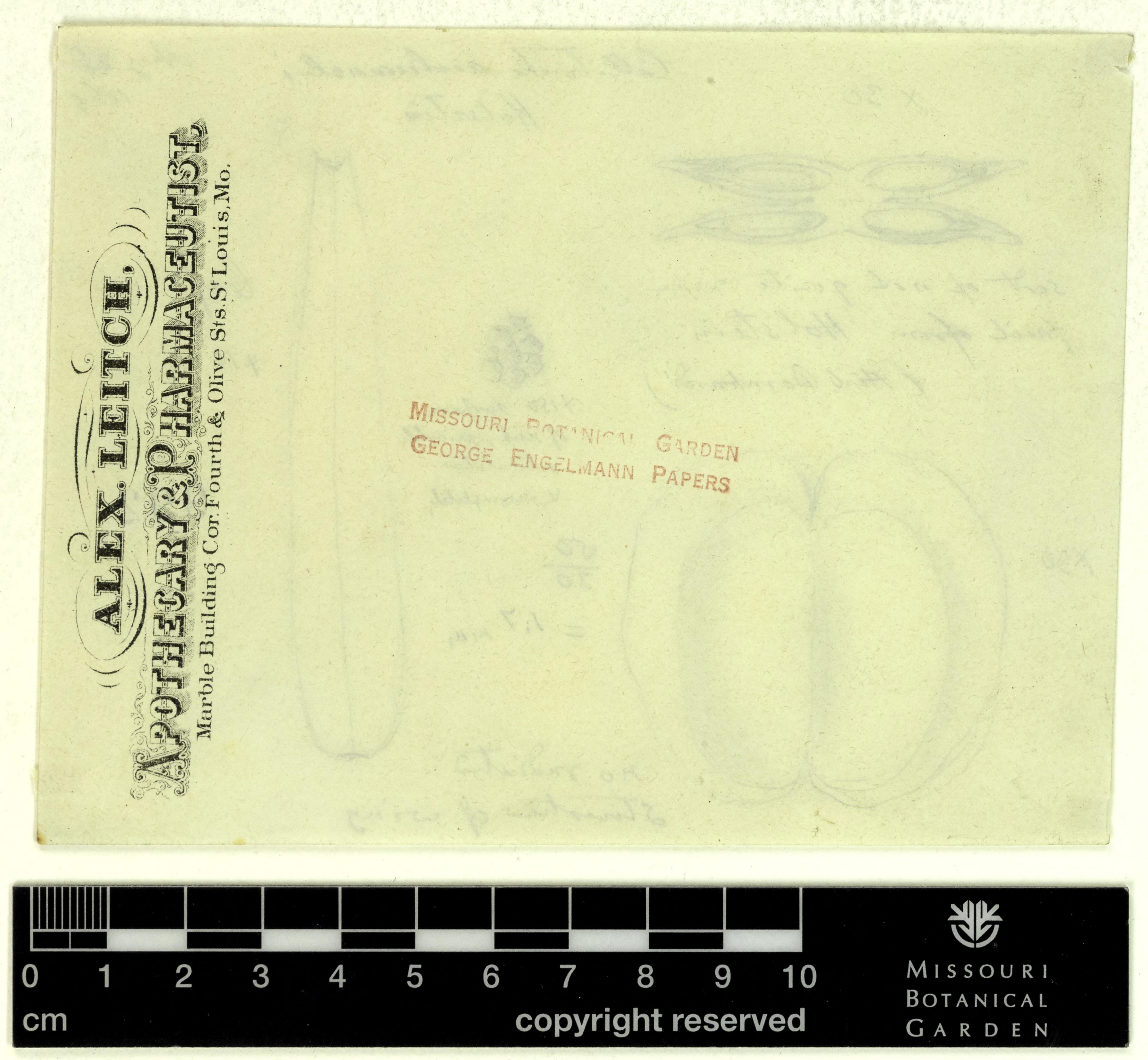
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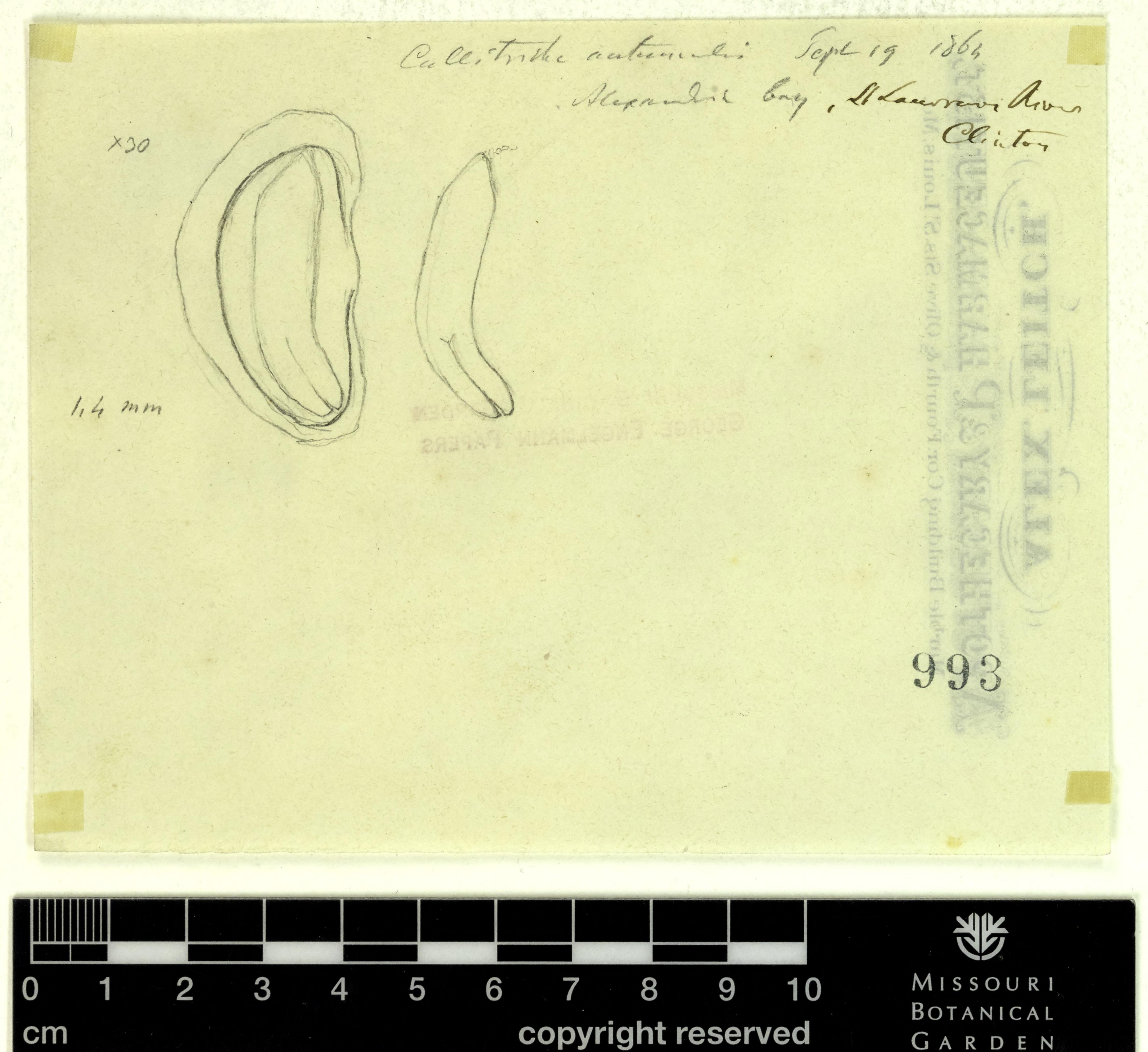


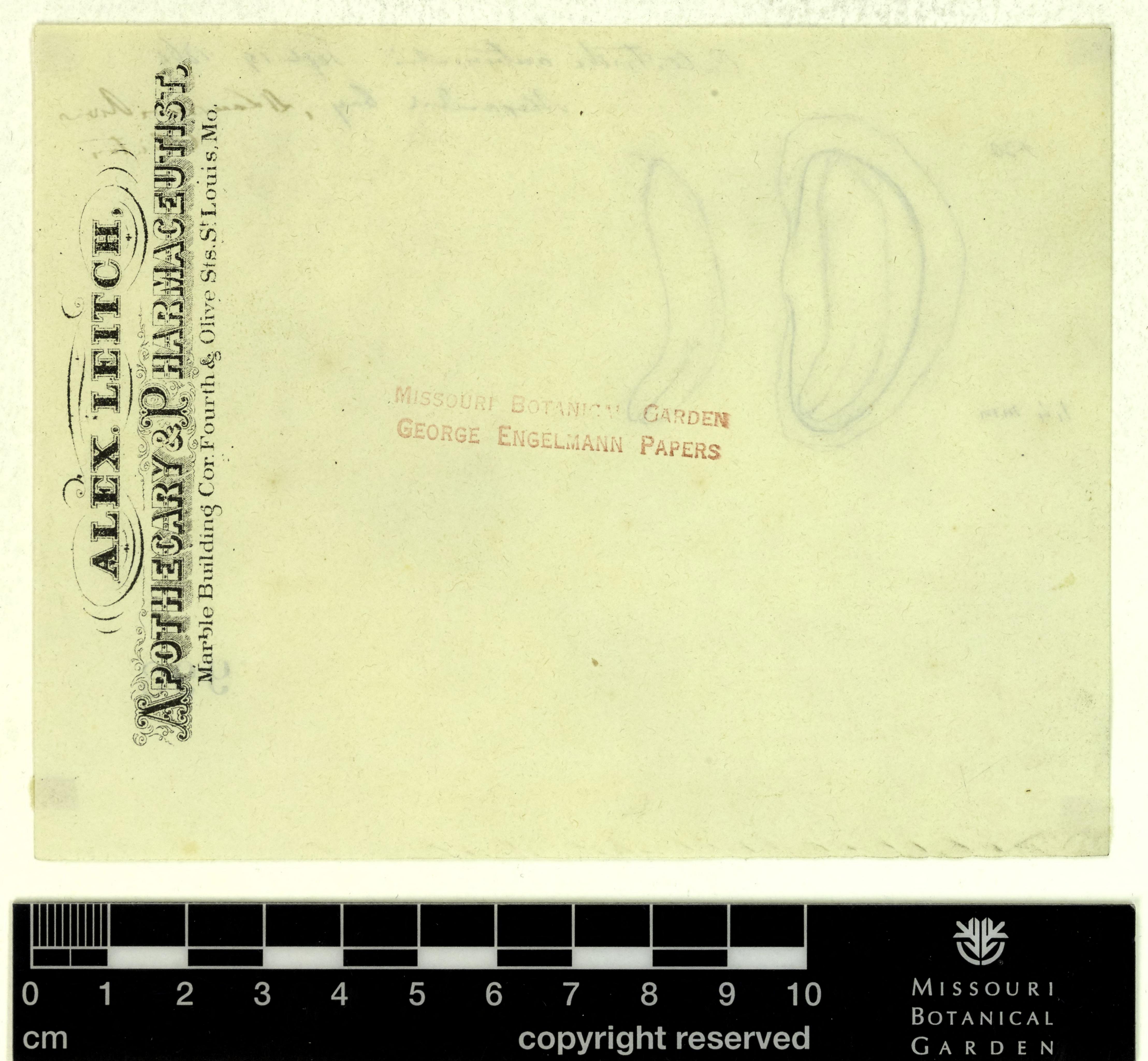
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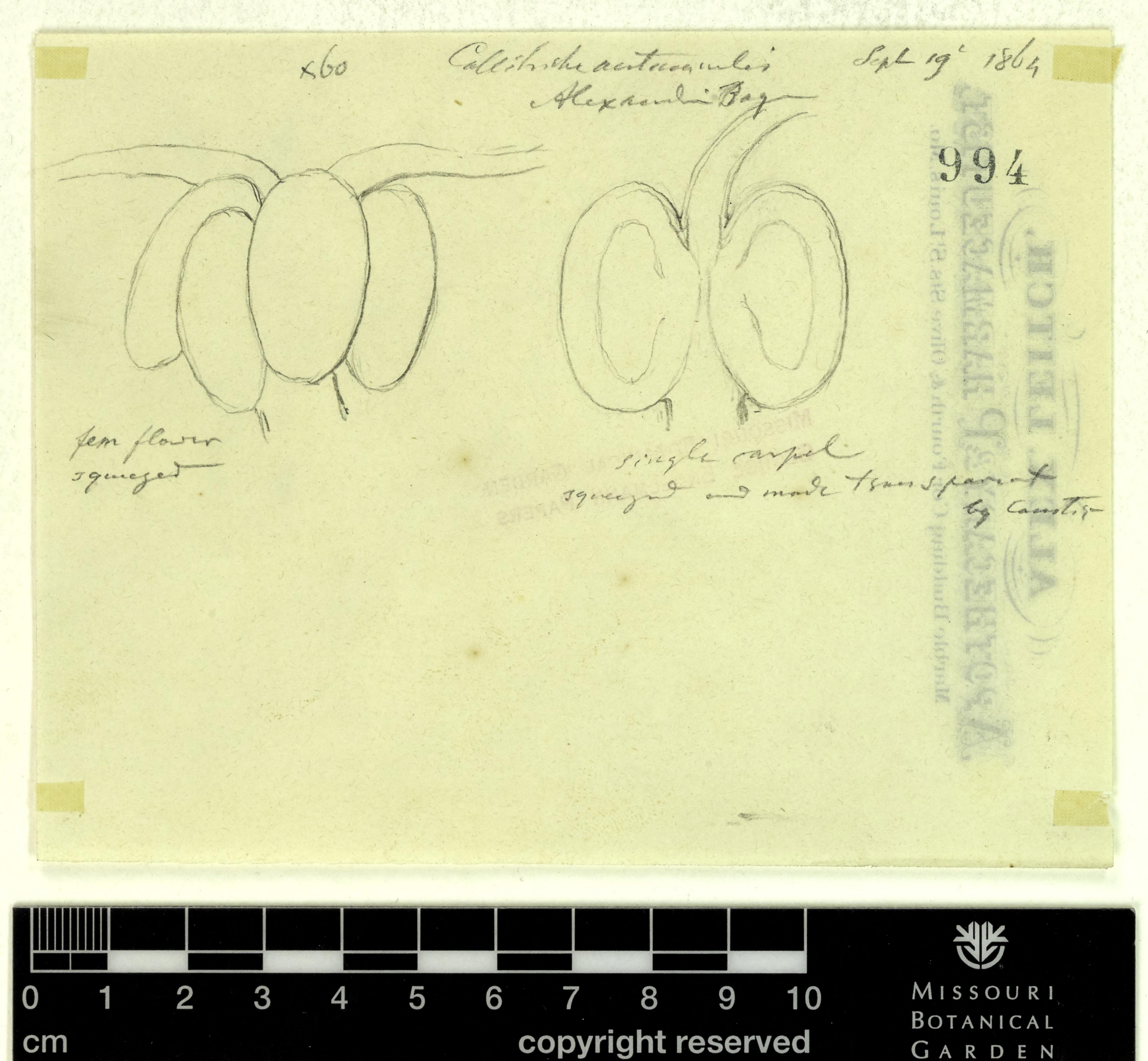


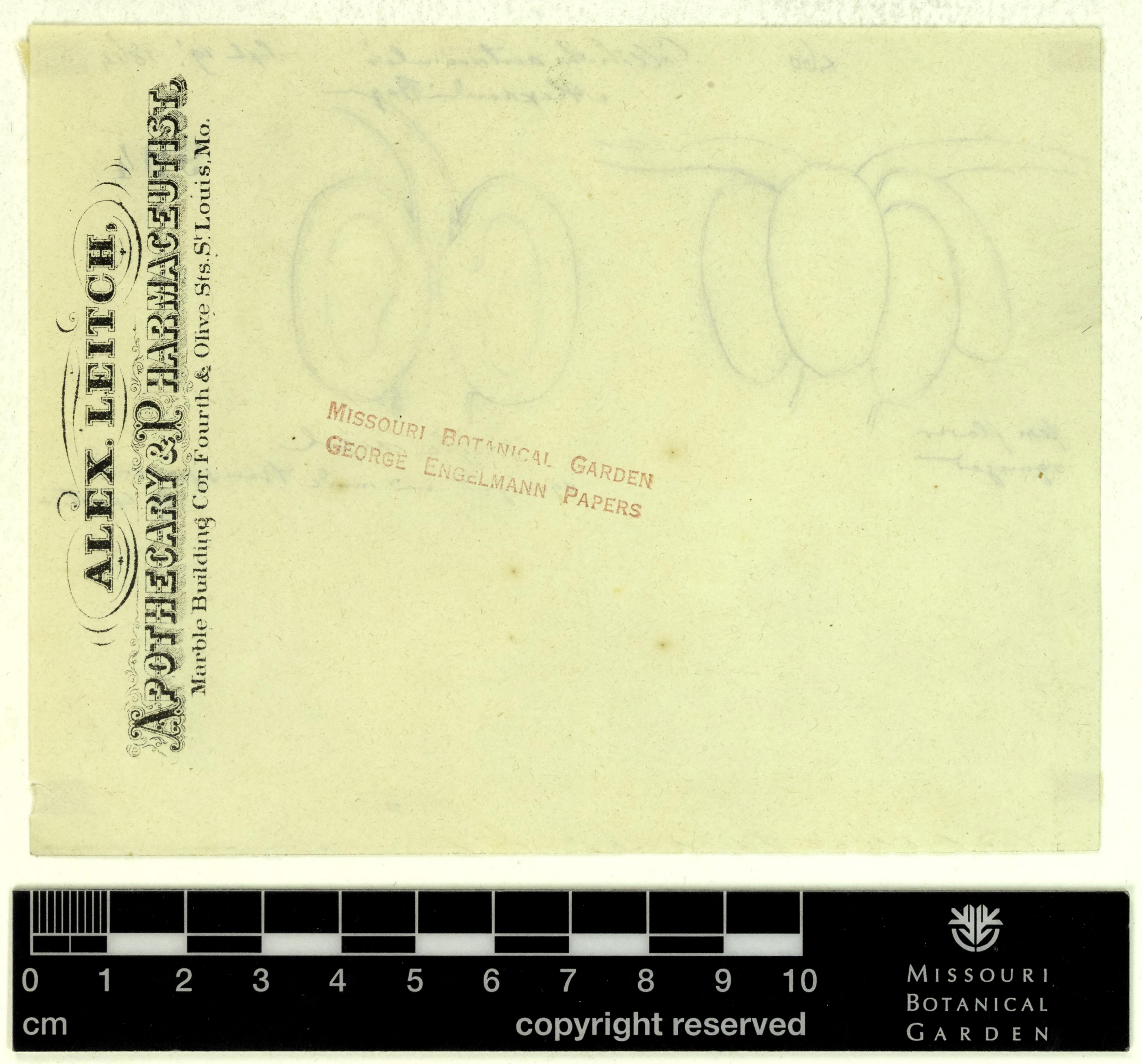




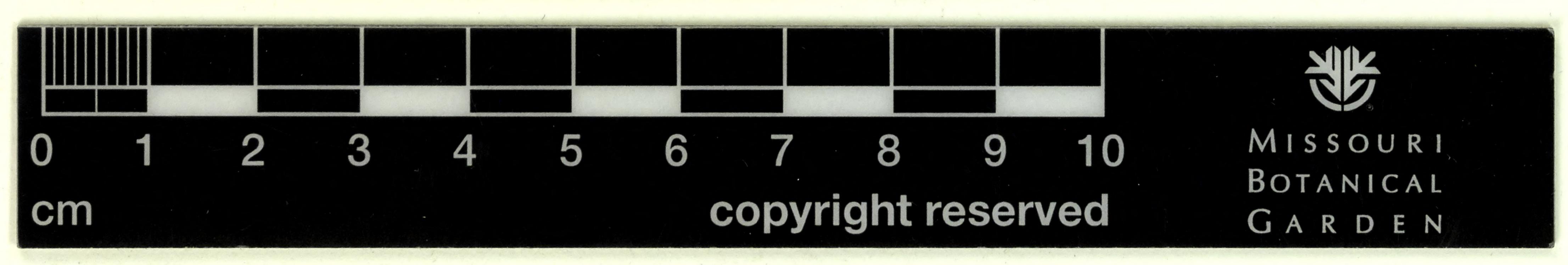


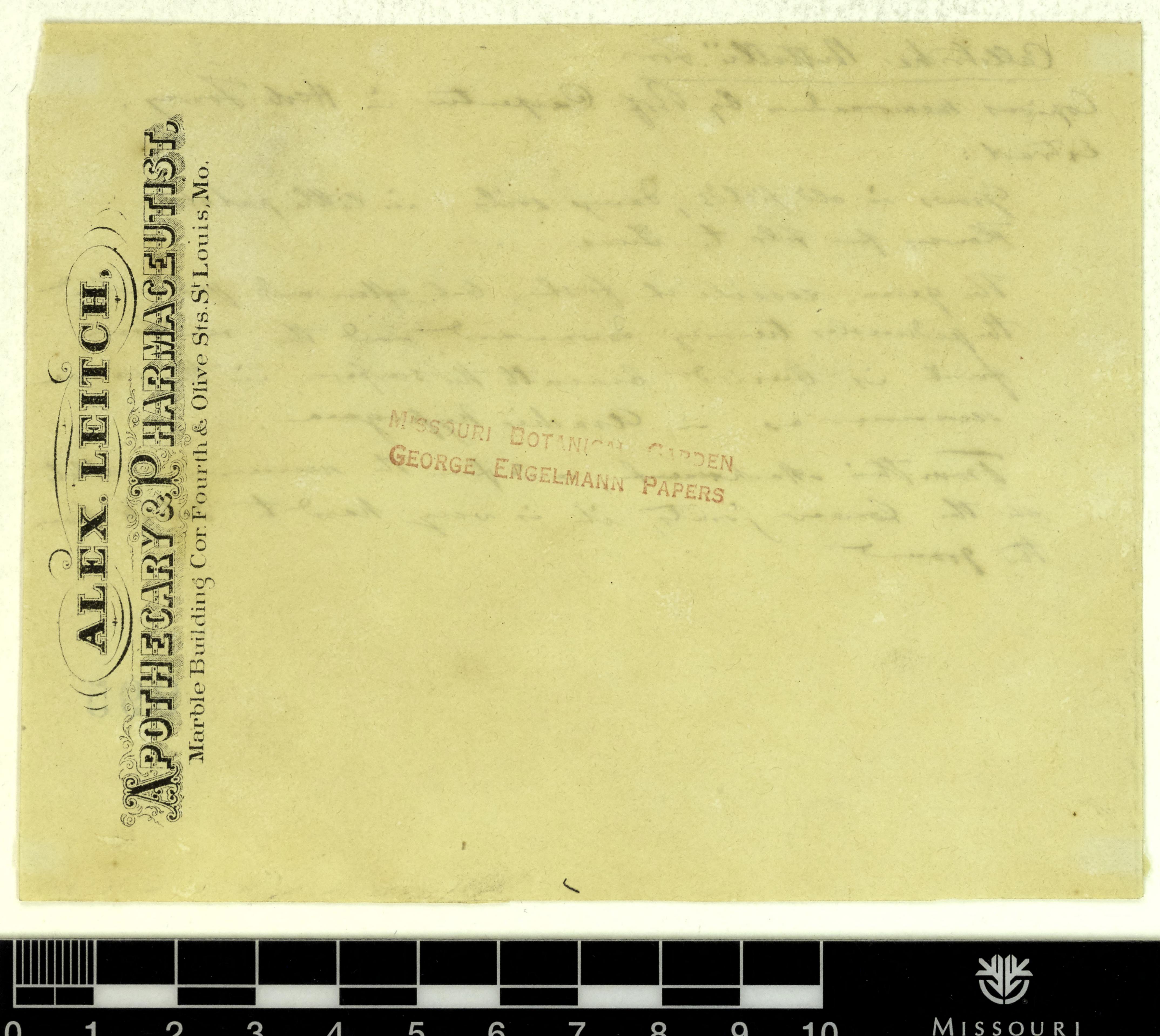


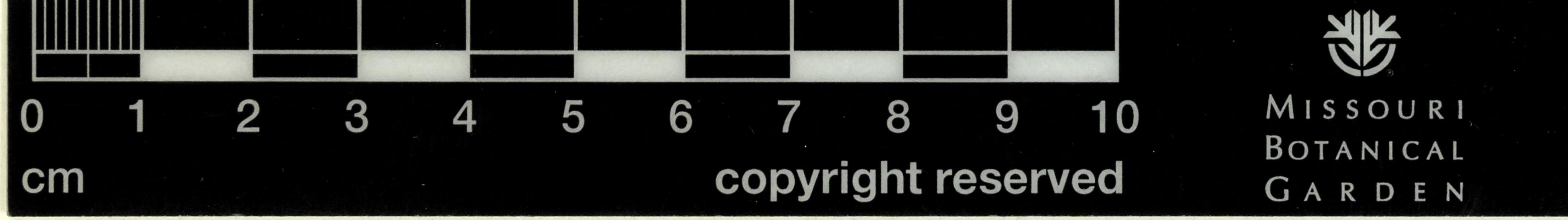




Calletrike Mittelli. Lom Copious memoraalus by Prof Carpenter in Herb Forrey. Extrad: Grows in old fields, damps soils in little pelches Howen for Film to Tune He gem sessile et fist, but aftervand pedre bed the persones treming downward and the reneform fruit is benied beneath the surface, in the same namen as in Aracher hypogona. from this affachousenf, and for the necessary wollety at the lower joints, it is very hand to detect from The grown







## Topaz in Utah. By HENRY ENGELMANN.

During my explorations in Utah as Geologist of the Expedition under Capt. J. H. Simpson, Top. Eng'rs. U. S. A., in 1858 and 1859, I observed some remarkably beautiful crystals of Topaz among some detritus of trachytic porphyry. They were perfectly colorless, transparent, sharply developed, and of great lustre. They were all short columnar. The largest of them measured scarcely one third of an inch in the direction of the basal cleavage, which was highly perfect. I observed ten modifications: all crystals exhibited (according to Prof. Rose's designation)

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\infty c: b: a , \infty c: b: 2a , c: \infty b: \infty a 1 , 4c: b: \infty a , 2c: b: a ; c: b: a ; a few only 2c: \infty b: a , and 4(?)c: b: a .
```

As in none of the crystals were both ends developed, I could not ascertain whether they were hemihedral, as is most common with topaz. The hardness of the mineral is =8. It is infusible before the blowpipe; and when strongly heat ed is coated with small blisters, but does not show any change of color. It exhibits the reactions of fluorine, alumina, and silex. No tests were made for other elements, nor were the crystals examined in regard to pyro-electricity and polarization of light. They exhibit double refraction quite plainly.

The locality of the mineral is near lat. 39° 40′, long. 113° 30′ west of Greenwich, west of south of Salt Lake, in Thomas' range of mountains, on Capt. Simpson's return trail. Circumstances prevented me from obtaining more than a few crystals, which are now deposited in the collection of the Smithsonian Institute; a few others are also in the hands of members of the party. We were travelling at the time by forced night marches with nearly worn out animals, seeking to gain a spring of water in a distant range of mountains. This desert was then entirely unexplored. I have but little doubt that more interesting materials are to be found at the same point.

The mountains of the former Territory of Utah promise a rich yield to the mineralogist. We know already of gold and silver ores in the east, west and south part of that district; of copper and lead ores in the south, and I have discovered the latter also in the centre of it; of specular iron ores and native sulphur in the Rocky Mountains and near Little Salt Lake; of rock salt in the mountains south-east of Utah Lake; of native alum near Salt Lake; of various other salts in the deserts; and of silicates, composing the granites, porphyries, diorites, trachytes, and lavas, nearly over the whole area.



## ELÆACRINUS KIRKWOODENSIS, n. sp.

Body very small, subglobose, a little longer than wide, flattened above and below. Basal pieces very gently concave, with their edges on a level with the plane of the under side. Radial pieces (fork pieces) reaching to the base and occupying more than four fifths the entire length of the body, narrow below and widest in the middle, sides gently arched. Interradial pieces subdeltoid, very prominent towards the apex, much longer than wide, obtusely angulated below, acutely angulated above, and notched on either side a short distance below the summit. Pseudo-ambulacral areas extending from base to summit, narrow, deeply impressed; sides nearly parallel; pore pieces amounting to about fifty in each field. A longitudinal fissure or slit extends from the central summit opening downwards, separating the pore pieces of one side from their fellows of the opposite for the distance of about one fifth the length of the field, thence their inner edges are united in the median line to the base. Pseudo-ambulacral spaces lanceolate, sloping gently from their edges to the sutures. Ovarial apertures eight, very minute, situated at the notches of the interradial plates. Analopening large, circular or very slightly elliptical. The surface markings are not plainly exhibited in any of the specimens I have collected of this species. On several of them I observe, more or less distinctly, irregular coarse rugæ or pittings, which, however, may be due to weathering.

Dimensions.—Length, 0.20 of an inch; width, 0.18.

The Elæacrinus Kirkwoodensis is nearly allied to E. (Pentremites) melo, from which it is distinguished by its much smaller size and less deeply excavated base. It also occupies a higher geological position.

Occurs in the St. Louis Limestone (Carboniferous) on the Pacific railroad near Kirkwood, St. Louis county, Missouri.

MISSOURI EOTANICA: CARDEN GEORGE ENGELMANN PAPERS

